WHAT IS CLAIMED IS:

1. A heat sink assembly comprising:

a monolith;

a cover which fits over the monolith to define a chamber, the cover having plural walls and an inlet through which fluid enters the chamber and an outlet through which the fluid exits the chamber;

wherein the monolith comprises a thermal transfer plate and a diffusion bonded wire mesh structure, the wire mesh structure being situated in the chamber to transfer heat acquired from the thermal transfer plate to the fluid in the chamber as the fluid travels through interstices of the wire mesh structure.

2. The heat sink assembly of claim 1, wherein the wire mesh structure is diffusion bonded to the thermal transfer plate.

3. The heat sink assembly of claim 1, wherein the thermal transfer plate is comprised of copper.

4. The heat sink assembly of claim 1, wherein the wire mesh structure is comprised of wire having a diameter in a range from about 0.0055 inch to about 0.016 inch.

5. The heat sink assembly of claim 1, wherein the wire mesh structure has a mesh size in a range of less than 100 mesh, preferably in a range from about 20 to 80 mesh, and more preferably in a range from and including about 40 mesh to and including about 50 mesh.

6. The heat sink assembly of claim 1, wherein the wire mesh structure is folded in an essentially serpentine configuration within the chamber.

7. The heat sink assembly of claim 1, wherein the wire mesh structure is folded at fold axes in an essentially serpentine configuration within the chamber, and wherein a path of the fluid in the chamber from the inlet to the outlet is not parallel to the fold axes.

8. The heat sink assembly of claim 1, wherein the wire mesh structure is folded at fold axes in an essentially serpentine configuration within the chamber, and wherein a path of the fluid in the chamber from the inlet to the outlet is substantially perpendicular to the fold axes.

9. The heat sink assembly of claim 1, wherein the cover has is an essentially parallelepiped with one open face and four side walls, wherein the wire mesh structure is folded at fold axes in an essentially serpentine configuration within the chamber, and the inlet and the outlet are provided on opposing sidewalls that are parallel to the fold axes.

10. The heat sink assembly of claim 1, wherein the wire mesh structure has an essentially spiral configuration within the chamber.

11. The heat sink assembly of claim 1, wherein the wire mesh structure has an essentially circular configuration within the chamber.

12. The heat sink assembly of claim 11, wherein the wire mesh structure is configured to comprise plural concentric rings within the chamber.

13. The heat sink assembly of claim 1, wherein the cover has an essentially parallelepiped shape with an open face and has four side walls, and a port wall which is opposite the thermal transfer plate, and wherein the inlet and the outlet are provided on the port wall.

14. The heat sink assembly of claim 13, wherein the inlet is provided in the center of the port wall.

15. The heat sink assembly of claim 13, wherein the outlet is provided proximate a corner of the port wall.

16. The heat sink assembly of claim 13, further comprising plural outlets, and wherein each of the plural outlets is provided proximate a respective corner of the port wall.

17. The heat sink assembly of claim 1, wherein the cover has an essentially parallelepiped with one open face, four side walls, and a port wall which is opposite and parallel to the thermal transfer plate, and wherein the port wall has a channel formed therein so that fluid is communicated through the channel in a direction that is essentially parallel to a plane of the thermal transfer plate.

18. A heat dissipation system comprising:

a body to be cooled;

a heat sink assembly comprising:

a monolith;

a cover which fits over the monolith to define a chamber, the cover having plural walls and an inlet through which fluid enters the chamber and an outlet through which the fluid exits the chamber;

wherein the monolith comprises a thermal transfer plate and a diffusion bonded wire mesh structure, wherein the thermal transfer plate is situated in heat conducting relation with the body to be cooled, wherein the wire mesh structure is situated in the chamber to transfer heat acquired from the thermal transfer plate to the fluid in the chamber as the fluid travels through interstices of the wire mesh structure

a pump which pumps fluid through a circulation path including the heat sink assembly.

19. The heat dissipation system of claim 18, further comprising a heat exchanger included in the circulation path, the circulation path being configured so that after the heat is transferred to the fluid in the heat sink assembly the fluid is cooled by the heat exchanger prior to the fluid being circulated back to the heat sink assembly

20. The heat dissipation system of claim 18, wherein the wire mesh structure is diffusion bonded to the thermal transfer plate.

21. The heat dissipation system of claim 18, wherein the thermal transfer plate is comprised of copper.

22. The heat dissipation system of claim 18, wherein the diffusion bonded wire mesh structure is comprised of wire having a gauge in a range from about 0.0055 inch to about 0.016 inch.

23. The heat dissipation system of claim 18, wherein the wire mesh structure has a mesh size in a range of less than 100 mesh, preferably in a range from about 20 to 80 mesh, and more preferably in a range from and including about 40 mesh to and including about 50 mesh.

24. The heat dissipation system of claim 18, wherein the wire mesh structure is folded in an essentially serpentine configuration within the chamber.

25. The heat dissipation system of claim 18, wherein the wire mesh structure is folded at fold axes in an essentially serpentine configuration within the chamber, and wherein a path of the fluid in the chamber from the inlet to the outlet is not parallel to the fold axes.

26. The heat dissipation system of claim 18, wherein the wire mesh structure is folded at fold axes in an essentially serpentine configuration within the chamber, and wherein a path of the fluid in the chamber from the inlet to the outlet is substantially perpendicular to the fold axes.

27. The heat dissipation system of claim 18, wherein the cover has is an essentially parallelepiped with one open face and four side walls, wherein the wire mesh structure is folded at fold axes in an essentially serpentine configuration within the chamber, and the inlet and the outlet are provided on opposing sidewalls that are parallel to the fold axes.

28. The heat dissipation system of claim 18, wherein the wire mesh structure has an essentially spiral configuration within the chamber.

29. The heat dissipation system of claim 18, wherein the wire mesh structure has an essentially circular configuration within the chamber.

30. The heat dissipation system of claim 29, wherein the wire mesh structure is configured to comprise plural concentric rings within the chamber.

31. The heat dissipation system of claim 18, wherein the cover has an essentially parallelepiped shape with an open face and has four side walls, and a port

wall which is opposite the thermal transfer plate, and wherein the inlet and the outlet are provided on the port wall.

32. The heat dissipation system of claim 31, wherein the inlet is provided in the center of the port wall.

33. The heat dissipation system of claim 31, wherein the outlet is provided proximate a corner of the port wall.

34. The heat dissipation system of claim 31, further comprising plural outlets, and wherein each of the plural outlets is provided proximate a respective corner of the port wall.

35. The heat dissipation system of claim 18, wherein the cover is an essentially parallelepiped with one open face, four side walls, and a port wall which is opposite and parallel to the thermal transfer plate, and wherein the port wall has a channel formed therein so that fluid is communicated through the channel in a direction that is essentially parallel to a plane of the thermal transfer plate.

36. A heat sink monolith comprising:
a thermal transfer plate;
a diffusion bonded wire mesh structure secured to the thermal transfer plate.

37. The heat sink monolith of claim 36, wherein the wire mesh structure is diffusion bonded to the thermal transfer plate.

38. The heat sink monolith of claim 36, wherein the thermal transfer plate is comprised of copper.

39. The heat sink monolith of claim 36, wherein the wire mesh structure is comprised of wire having a gauge in a range from about 0.0055 inch to about 0.016 inch.

40. The heat sink monolith of claim 36, wherein the wire mesh structure has a mesh size in a range of less than 100 mesh, preferably in a range from about 20 to 80

mesh, and more preferably in a range from and including about 40 mesh to and including about 50 mesh.

41. The heat sink monolith of claim 36, wherein the wire mesh structure is folded in an essentially serpentine configuration.

42. The heat sink monolith of claim 36, wherein the wire mesh structure has an essentially spiral configuration.

43. The heat sink monolith of claim 36, wherein the wire mesh structure has an essentially circular configuration.

44. The heat sink monolith of claim 43, wherein the wire mesh structure is configured to comprise plural concentric rings.